Long Term Goals and Performance Targets

Goals	FY 2009 Targets	FY 2010 Targets	FY 2011 Targets	FY 2012 Targets	FY 2013 Targets	FY 2014 Targets	FY2015 Targets	FY 2016 Targets	FY 2018 Targets	FY2020 Targets
Electricity Delivery and Energy Reliability/Research and Development/High Temperature Superconductivity										
Develop prototype wire achieving 1,000,000 length-critical current (A-m)for second generation wire		Demonstrate prototype 70,000 A-m critical current-length for second generation wire		Demonstrate prototype 100,000 A-m critical current-length for second generation wire		Demonstrate prototype 500,000 A-m critical current-length for second generation wire	Demonstrate prototype 800,000 A-m critical current-length for second generation wire			Demonstrate prototype 1,000,000 A-m critical current-length for second generation wire
By 2014, produce high temperature superconducting coil that operates in applied magnetic fields up to 5 Tesla at 65K for HTS applications	Demonstrate prototype superconducting coils operating in magnetic fields of 2 T at 65K			Demonstrate prototype superconducting coils operating in magnetic fields of 3 T at 65K		Demonstrate prototype superconducting coils operating in magnetic fields of 5 T at 65K				
By 2012, verify operating characteristics and reliability of high-capacity HTS cables for distribution level systems and gain industry acceptability and establish design rules based on the full characterization of mechanical and electrical properties of existing and new dielectric materials at cryogenic temperatures	Fully characterize existing materials at high voltages and cryogenic temperatures in AC applications	• Establish criteria and Institute of Electrical and Electronics Engineers (IEEE) testing standards forcryogenic dielectrics at distribution and transmission voltages up to nominal 161 kV • Develop design rules based on existing materials		• Fully characterize new dielectric materials at high voltages and cryogenic temperatures • Develop database of cryogenic dielectric materials and update design rules						
Electricity Delivery and Energy Reliability/Research and Development/Visualization and Control										
By 2014, develop tools and algorithms to enable an automatic, smart, real-timeswitchable network for transmission and distribution system operations that enables secure and reliable grid operations for major regions of the country	Develop a prototype dynamic security assessment tool to strengthen state estimation capabilities and improve analysis of system dynamics	Develop a prototype electromechanical grid stability alarm tool enabling analysis of characteristic grid oscillations	• Develop a prototype contingency evaluation tool that enables analysis of the ability of the system to withstand contingencies • Deploy 50 distribution-level	• Deploy 50 additional distribution-level sensors as part of developing a smart, real-time switchable network • Develop operator decision support tools		• Develop common standards and protocols for interoperability among various systems and subsystems • Deploy an automatic, smart, real-time switchable				

Long Term Goals and Performance Targets

Goals	FY 2009 Targets	FY 2010 Targets	FY 2011 Targets	FY 2012 Targets	FY 2013 Targets	FY 2014 Targets	FY2015 Targets	FY 2016 Targets	FY 2018 Targets	FY2020 Targets
			sensors as part of developing a smart, real-time switchable network			network for transmission system operations in a major region of the country				
By 2012, demonstrate cost-effective security solutions with minimum host impact, and make available a scalable virtual control system environment tool to energy sector stakeholders	Complete cyber security assessments of six SCADA systems in test bed environment	Complete development of SCADA protocol security authentication technology	Demonstrate a cyber security evaluation tool that enables analysis of the impact of cyber security technologies on control systems performance							
Electricity Delivery and Energy Reliability/Research and Development/Energy Storage Power and Electronics										
By 2020, develop prototype battery/super-capacitor systems with three-fold increase in stored energy and super-capacitors with operating voltages two-to-three times greater than today's systems		Increase energy density in battery or electrochemical capacitor systems by 10%			Increase energy density in battery or electrochemical capacitor systems by 50%			Increase energy density in battery or electrochemical capacitor systems by a factor of two		
By 2025, demonstrate a prototype solid state breaker (switch) with less than 1 millisecond response time				Develop switching systems (power electronics) at 10,000 volts/10 amps with a switching speed of 4 ms					Develop switching systems (power electronics) at 20,000 volts and 100 amps by FY18 operating effectively at 250℃	
Electricity Delivery and Energy Reliability/Research and Development/Renewable and Distributed Systems Integration										
By 2015, demonstrate 20% peak load reduction on distribution feeders with the implementation of Distributed Energy and Energy Management Systems	Verify 5% peak load reduction achieved for a constrained feeder	Verify 10% peak load reduction achieved for two constrained feeders	Verify 10% peak load reduction achieved for two additional constrained feeders	• Verify 15% peak load reduction achieved for a constrained feeder • Demonstrate data acquisition and two-way communication systems by FY12, which enables load	Verify 15% peak load reduction achieved for two additional constrained feeders	Verify 15% peak load reduction achieved for two additional constrained feeders	Verify 20% peak load reduction achieved for a constrained feeder			

Long Term Goals and Performance Targets

Goals	FY 2009 Targets	FY 2010 Targets	FY 2011 Targets	FY 2012 Targets	FY 2013 Targets	FY 2014 Targets	FY2015 Targets	FY 2016 Targets	FY 2018 Targets	FY2020 Targets
				management by both utilities and consumers to serve their respective needs						
By 2012, complete development of IEEE 1547 series of standards, with DG islanding applications verified and validated by 2015		• Develop interconnection equipment reliability database and tools for renewable and distributed systems integration and interoperability • Initiate development of an IEEE/ International Electrotechnical Commission (IEC) dual logo international standard based on IEEE 1547	Complete IEEE P1547.4 - Standard Guide to islanding DG with the grid by FY11, with rec●ommended design topologies, equipment for grid operational configurations	• Reaffirm and revise American National Standards Institute (ANSI) IEEE 1547 – Interconnection of DER with the Electric Power System • Develop recommendations for interconnection systems improvements and cost reduction			Verify and validate the application of distributed energy systems for safe, secure, and cost-effective “islanding” operations while in compliance to 1547.4			
Electricity Delivery and Energy Reliability/Permitting, Siting and Analysis										
Electricity Delivery and Energy Reliability/Infrastructure, Security and Energy Restoration										